

F.S.T CONTENTS 23



HEALTH WATCH

85-88

Keystones of good health - the body's defences - the importance of diet smoking and lung cancer - effect of environment on health - pollution - sick building syndrome

THE LIVING WORLD



GERM WARFARE

93-96

The immune system - killer blood cells immunization - types of germ - 'good' and 'bad' bacteria - invasive viruses deadly protozoa - harmful fungi



NEW TECHNOLOGY

SURGERY NOW

131-134

Modern anaesthetics - sterile kit specialized lasers - precision surgery treating tumours - endoscopes reconnecting severed limbs - organ transplants - plastic surgery

MEDICAL MIRACLES

135-136

Restoring sight - hearing implants heart pacemakers - controlling diabetes - replacing damaged joints

LIFESAVING MACHINES

137-140

Uses of X-rays - scanners that see inside the body - medical lasers kidney dialysis - heart and lung machines

FUTURES





activity



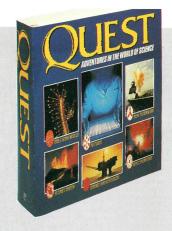


HEALING FORCES

73-74

Pain killers - specific and broad spectrum antibiotics - problem of side effects - complementary medicine holistic approaches

Pack cover: a modern surgery (main picture); X-ray of a lung – the orange spots are cancerous areas (inset). Fact file cover: making a 3-D image of the brain; diagram of the nose and mouth.



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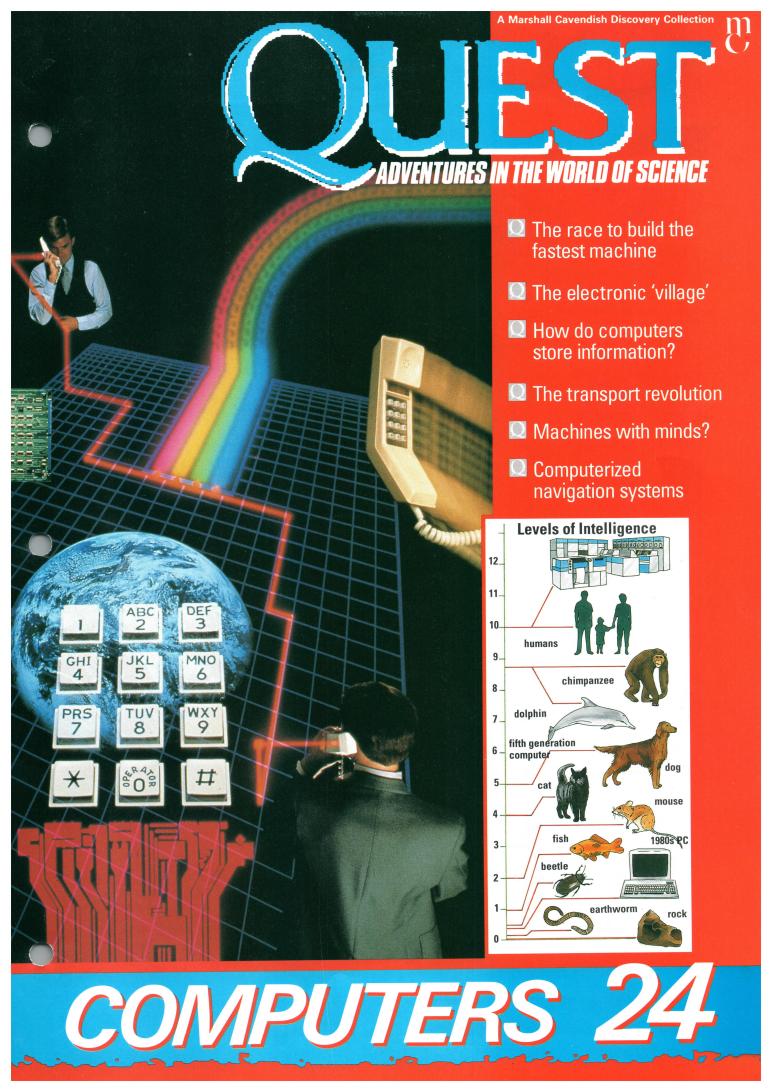
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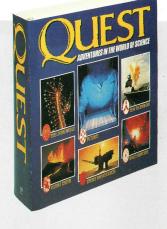


PLANET EARTH

GLOBAL VILLAGE

89-92

The electronic 'village' – worldwide communications network – security problems – computer viruses – malicious hackers – hostile programs



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NEW TECHNOLOGY

ROBOTICS

141-144

Teaching robots their jobs – automated assembly line – camera 'eyes' – androids – synthesizing the human voice – brainy computers

MEMORY BANKS

145-146

Computer storage systems – bits and bytes – built-in programs – losing info – back-up systems – hard and soft discs

MULTI-MEDIA

147-150

Advanced programming techniques – hi-tech graphics and animation – ray tracing – digital picture manipulation – on-line poetry



FUTURES

SUPERCOMPUTERS

79-80

Ten billion calculations per second – ever-faster speeds – programs that mimic the brain – simulating accidents – mapping air flow

THE FIFTH GENERATION

81-82

Silicon chips – thousands of transistors – supercooled superconductors – the optical computer – pulses of light

ENERGY AND RESOURCES

SUPER CIRCUITS

75-78

Active suspension systems – in-car navigation – safer cornering – global satellite network – computer pilots – stabilizing superlight military jets



Pack cover: Mission control at the Jet Propulsion Laboratory, California, USA; the flow of air around a car as modelled by a Cray supercomputer. **Fact file cover:** impression of a worldwide communications network; diagram of different levels of intelligence.

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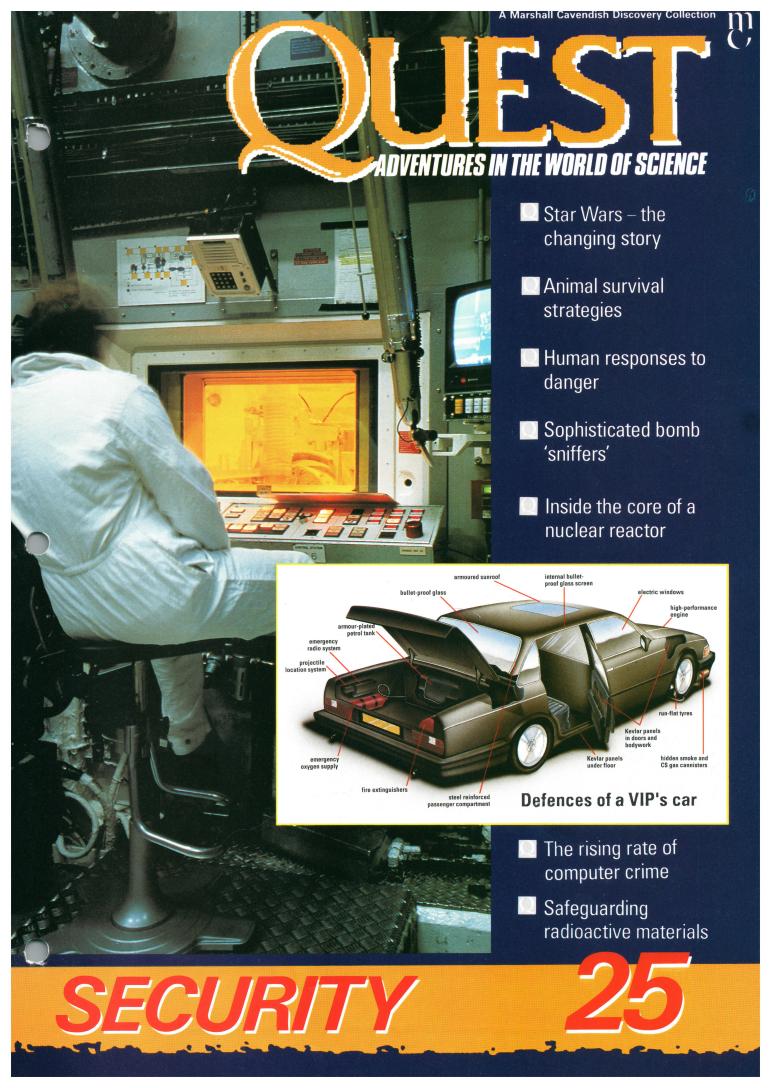
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PLANET EARTH

NATIONAL SECURITY

93-96

Natural and man-made boundaries – frontiers – illegal immigrants – air space

THE LIVING WORLD

SELF DEFENCE

83-84

The body's response to danger – martial arts – forbidden moves – skill rating system



THE FIGHT TO SURVIVE

97-100

Staking out territory – survival strategies – hunting in packs – camouflage



NEW TECHNOLOGY

TECHNOLOGY V TERROR

151-154

Airport security – electronic detection – armoured cars – bank vaults

COMPUTER WATCH

155-156

Bank fraud – stealing data – hacking – the password – sharing secret information



GLOBAL DEFENCE SYSTEM

31 - 32

'Star Wars' – early warning satellites – meteorite catastrophe – Clementine Probe



FUTURES

UNDER SURVEILLANCE

83-84

Electronic tagging – tapping telephones – spying – recognition systems – bugs



NUCLEAR SAFETY

79-80

Dangers of fission – splitting atoms – transporting nuclear waste – terrorist threat



Pack cover: a bank vault with the door open (main image); publicity material from a computer company advertising the security of its systems.

Fact file cover: monitoring by computer the stripping down of spent fuel rods at a power station;

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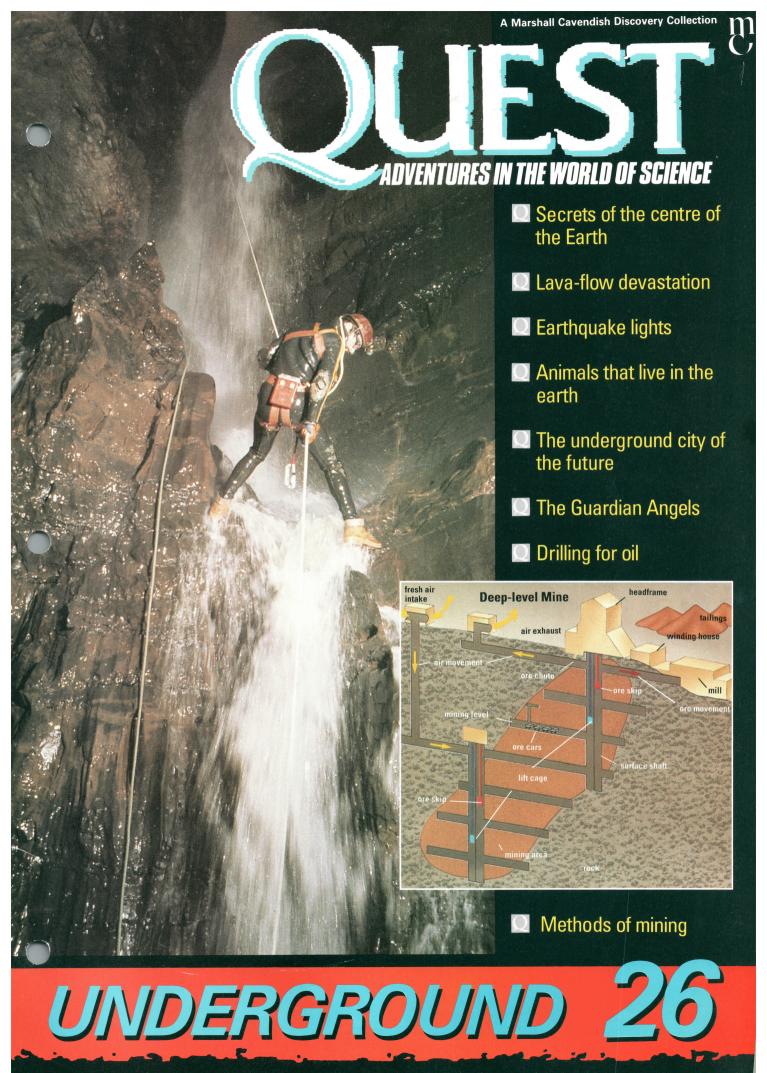
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TO THE EARTH'S CORE

97-100

The mantle - Reflection seismology stalactites and stalagmites - five types of volcano – gevsers and fumaroles

EARTHQUAKE!

101-104

The longest quake – fault lines – the epicentre – tsunami – seismograms satellite monitoring - the Richter Scale

THE LIVING WORL

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THE UNDERWORLD

101-104

Nitrifying bacteria - the world of worms digging claws and teeth - burrows and tunnels - living in darkness



SUBWAY

157-160

Signalling systems - driverless trains world's largest station - 'steel on steel' -Eurotunnel – deep lines – beating crime



DOWN TOWN

85-86

Underground building – 'Earth-sheltered' technology – NORAD – Geofrontier

project - earthquake-proofing - The Granite Vaults



MINING THE EARTH

81-84

Coal reserves - environmental pollution the deepest mine - how diamonds form bucket-wheel excavators - blasting

Pack cover: the Paris Métro (main image); an eruption of Mt Kilauea on Hawaii. Fact file cover: abseiling down an underground waterfall; cross-section of a deep-level mine (inset).



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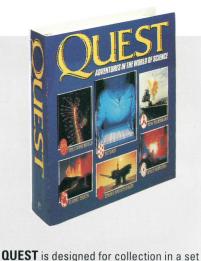
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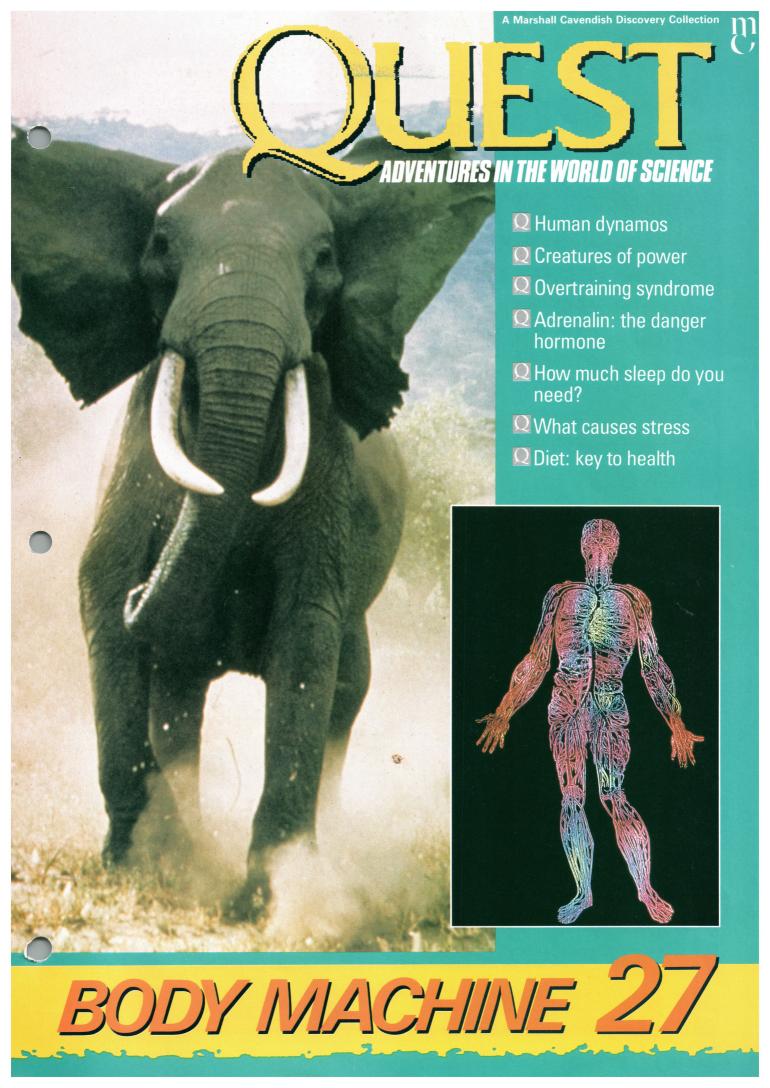
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IFS CONTENTS 27



SUPERMEN

105-108

Muscle types - world-class material mental attitude - sport psychologists aerobic and anaerobic breathing oxygen debt - preventing 'burn out'

ADAPT OR DIE

109-110

Evolutionary forces - human skin colour prehensile tails - Arctic adaptation gliding animals - desert creatures fooling predators - insect mimicry

THE LIVING WORL

HUMAN MACHINES

Physical prowess - how blood

circulates - involuntary muscles -

design of the heart - body's shock



RAW POWER

- coma

109-112

Might of the dung beetle - killer croc fastest animals - undersea poisoners ink clouds and tentacles - how snakes swallow - stink glands

absorbers - receptors - Siamese twins



NEW TECHNOLOGY

BODY PARTS

161-162

Man-made joints - skin electrodes touch sensors - a cure for deafness? bionic ear implants – tungsten carbide bones - artificial skin

ENERGY AND RESO

BODY MAINTENANCE

85 - 88

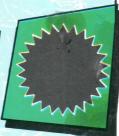
A balanced diet - weight control calories - exercise - protein and carbohydrate - meditation and relaxation - body repairs while you sleep

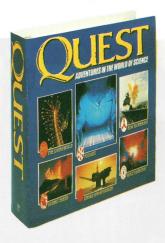
STRESS: THE KILLER

89-90

Fight or flight response - pain gate phenomenon - addicted to thrills - a surge of adrenalin - body breakdowns drug treatments - panic attack

Pack cover: A body-builder flexes his muscles; false-colour, X-ray image of human arteries (inset). Fact file cover: A charging African elephant; false-colour version of an engraving of the venous system.





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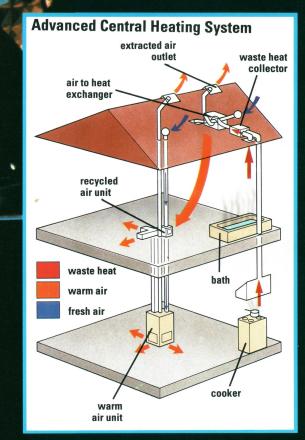
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ADVENTURES IN THE WORLD OF SCIENCE

- Luxury caravans
 - Ultrasound cleaning
 - Computer-controlled living
- Inside the beehive
- Decompression chambers
- Devastation by earthquake



HOMES

28

JEST CONTENTS 28



GOING PLACES

111-114

Nomadic tribes – yurts and tepees – luxury caravans and campers - the Nullarbor-crosser - floating villages mobile homes – ocean-going boats – 'cardboard city'

POWER CLEANING

115-116

Dust mites - cleaning machines - how detergents work - ultrasound cleaning - biological powders - grime-busting enzymes - biodegradable foam - inside your toothpaste

CATASTROPHE!

117-118

Tracking Hurricane Hugo - shanty town destruction - building in earthquake zones - search and rescue - flooding when lightning strikes - the quake baby

THE LIVING WORLI

ANIMAL STRONGHOLDS

113-114

Security from predators - social insects - underground store houses - inside the beehive - burrows and mounds - the beaver's lodge - secrets of the cuckoo - the hornet's nest

CREEPY-CRAWLIES

115-118

Viruses, bacteria and fungi - bad fruit and rotting meat - the smell of decay air-borne mould - dry-rot fungus cockroach infestation - bedbugs and fleas - the living fossil



HOME FROM HOME

163-166

Life on an oil rig - decompression chamber - aboard an aircraft carrier living underwater - travelling in Voyager - SAS survival training - inside a lorry driver's cab

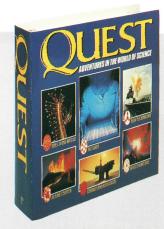


DESIGNS FOR LIVING

87-90

Shape of tomorrow's homes controlled environments - the plastic house - energy efficient houses - solar panels - heat pump central heating soil insulation - video phones





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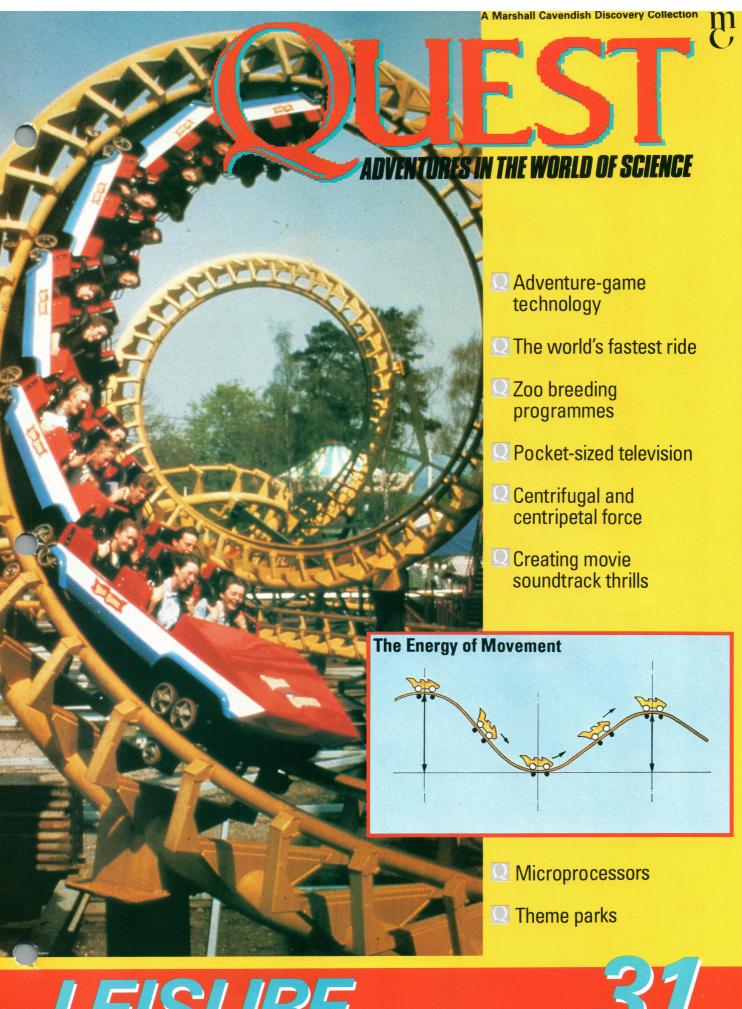
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Pack cover: New York by night; thermograph of heat distribution on house (AGA Infrared Systems/Science Photo Library); Fact file cover: Spaceship Earth, Walt Disney World, Florida, USA; diagram of a modern central heating system.



LEISURE



PLANET EARTH

AWAY DAYS

125-128

Leisure and theme parks – Walt Disney World – Project Zeri – Space Camp – controlled environments – the Astrodome and Superdome

THE LIVING WORLD



WHERE WILD THINGS ARE

Zoo conservation schemes – ISIS and NOAH – a keeper's work – veterinary care – 'stereotyped' behaviour – new enclosure design – nature parks





NEW TECHNOLOGY

WONDERWORLDS

189-192

Electronic games – powered chairs – laser discs – strategy and shoot-outs – 'virtual reality' – Eye-Phone and Power Glove – 'surround-sound'

TERROR RIDES

193-196

Wild roller-coasters – corkscrews and vertical loops – the forces of motion – steel and wood constructions – computerized safety bars

MONSTER MOVIES

197-198

Special-effects make-up – aging actors – making scars – screen blood – continuity illusions – stop-motion photography – cable-operated puppets

HI-TECH TOYS

199-200

How radio-controlled models work – microprocessors and servos – computers-on-a-chip – a 'failsafe' system – CompuTrain

FUTURES

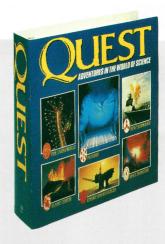
MICRO SOUND AND VISION

95-96

Miniaturization technology – LCD screens – portable televisions – secrets of Private Eye – the smallest telephone – electronic organizers



Pack cover: Mechwarrior battle simulator; killer whales at Marineland, California, USA (S. Roux/Jerrican). Fact file cover: The Corkscrew, Alton Towers, Great Britain; illustration of the energy of movement.



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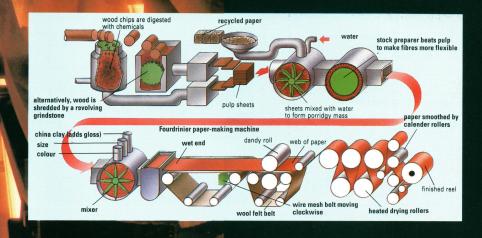
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ADVENTURES IN THE WORLD OF SCIENCE Customized manufacturing Cells – the building blocks

- of life
- Super-fast freezing techniques
- Robots with 'eyes'
- The food chain
- Automation technology
- Q The work ethic
- Biodegradable plastic



Industries that work around the clock

AUTOMATION

CONTENTS 32



WILL TO WORK

129-130

The labour force - approaches to management - teamwork - company loyalty - encouraging ambition competition - training courses promoting creative thought

BIOLOGICAL FACTORIES

centre - different types of cell

The structure of cells - how plant and

animal cells differ - nucleus: the control

133-134



NON-STOP PRODUCTION

201-204

Round-the-clock industries - power generators - oil refining - chemical and metal production - smelting - continuous casting of molten steel - paper-making cement works - glass plants

AUTOMATION TECHNOLOGY

205-208

Computerized robots - robot arms motorized joints - sensors - camera 'eyes' - Automatic Guided Vehicles designing on computer



MASS-MADE TO ORDER

Limitations of assembly lines -

customizing mass-produced goods -

optional extras for cars - automatic

97 - 98



tailoring systems

FOOD INDUSTRY

93 - 96

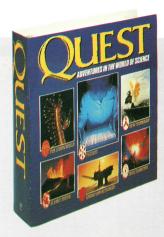
Ensuring hygiene - testing for bacteria the 'cold chain' - homogenization pasteurization - 'fresh' salad in tins growing natural flavourings in the laboratory - super-fast freezing

RECYCLING

97-100

Separating scrap metal from other materials - re-using lead - extracting chemicals from old rubber tyres - bottle banks - new cans from old

Pack cover: the control room of a steel-making plant (main image); robots weld car bodies on a production line. Fact file cover: casting steel; diagram of the paper-making process.



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- Air and sea rescue
- Tackling oil-rig fires
- Animals in danger
- The Space Shuttle Ejector
- The Ivory Trail of death
- The limits of human endurance
- Aircrash survival aids



'Superbugs' to devour oil slicks

RESCUE

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OPERATION CLEAN-UP

131-132

Deadly oil spills - destruction of wildlife polluted water – dispersant chemicals – laser 'torches' – skimmer ships – nuclear waste disposal - landfill sites

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Poaching - hunting the hunters -

135-138

endangered plants and animals - the ivory trade - the tranquillizer dart - protection



schemes - breeding species in captivity

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209-212

Motorized ejection seats - airline crashes oxygen masks - canvas chutes - lifejackets - inflatable dinghies

FIGHTING FIRE

213-216

Standpipes – turntable ladders – hydraulic platforms - mobile control unit - fire fighting tactics - 'firelines' - 'blow outs'

EMERGENCY SERVICES

217-220

Ambulance crews - resuscitators - heart monitoring units - thermal imaging camera - mountain rescue - coastguards

33 - 34





Stranded in Space - severed fuel lines lunar 'lifeboat' - life support systems filtering out CO2 - repairing satellites

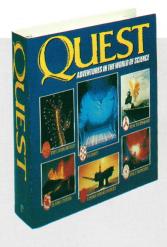


BRAVING THE ELEMENTS

101-102

Extremes of temperature - dehydration hypothermia - protective clothing surviving in the sea - shark attack

Pack cover: skyscraper fire in Sao Paulo, Brazil; rescuing the driver of a blazing racing car during the 1989 French Grand Prix (inset). Fact file cover: Swiss mountain-rescue team at work in the Alne cutaway diagram of an airnort fire engine



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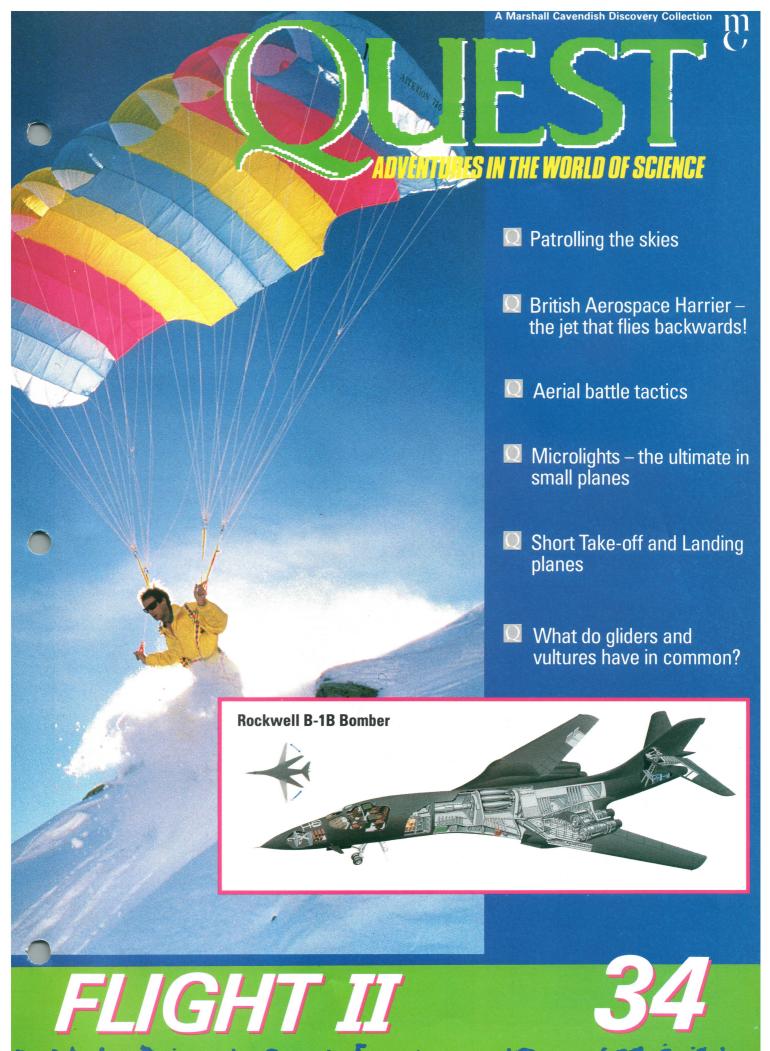
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PLANET EARTH

MAN-POWERED FLIGHT

133-136

Muscle power - new-generation machines - super-strong materials battery-powered planes - staying airborne - breaking records

NEW TECHNOLOGY

VERTICAL TAKE-OFF

221-222

Vertical thrust - battle tactics - Short Take-off and Landing planes generating extra lift - tilt-rotor aircraft

AERIAL WARFARE

223-226

Military planes - Multi-purpose fighters strategic bombers - radar tracking stations - dogfights - swing-wings.

CIRCUS IN THE SKY

227-230

Split-second timing - high-performance jets - anti-G suits - aerobatics spectacular smoke trails - dual stunts

MICROLIGHTS

231-232

Fun flying - simple controls - small engines - cruising and stalling speeds safety factors -stability - rotor blades



FUTURES

AIRPORT 2000

99-100

Air-traffic congestion - computerized check-in - robot baggage handlers - high-security systems - seadromes

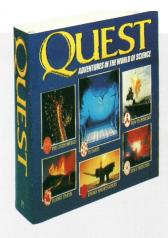
ENERGY AND RESOURCES



103-106

Gliders - winch launching and towing tracking thermals - parachute 'breaks' manoeuvring a hang-glider streamlined harnesses

Pack cover: the RAF's display team – the Red Arrows (main picture); the cockchafer beetle (inset). Fact file cover: parachutist jumping off a mountainside; diagram of the Rockwell B-1B bomber.



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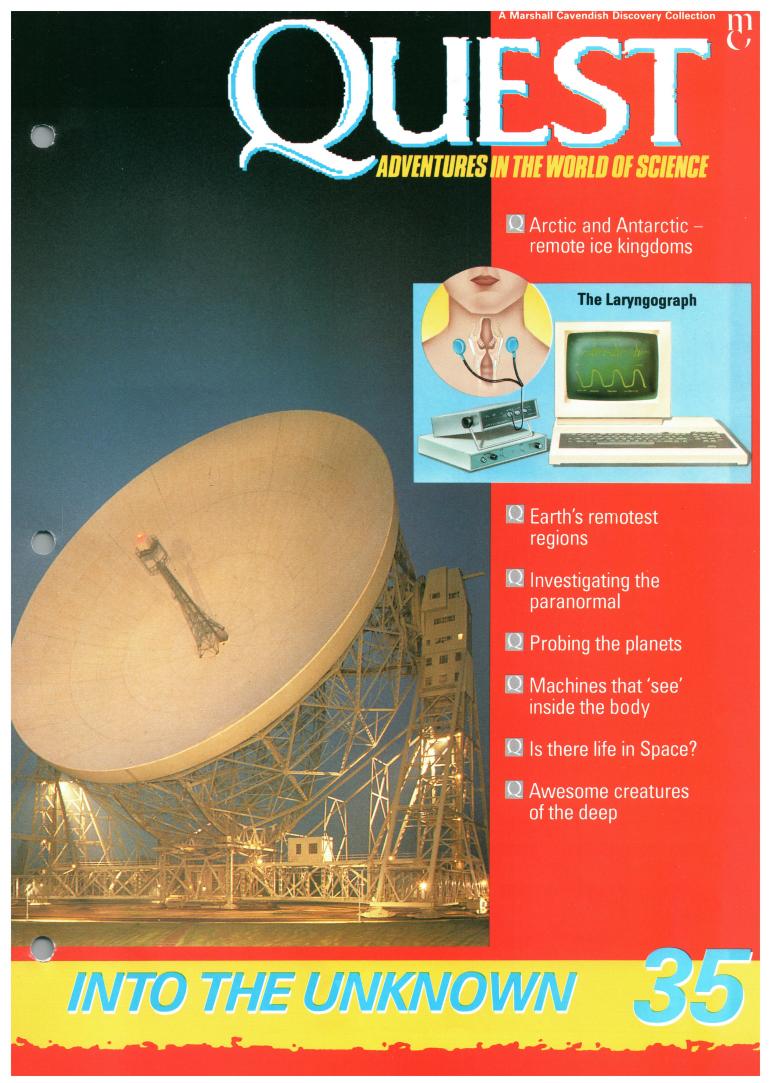
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PLANET EARTH

STRANGE WORLDS

137-140

Remote regions - mountain ranges - walls of ice - exploring oceans - submersibles the deepest caves - dense jungles - frozen Arctic wastes

THE LIVING WORLD



EARTHLY MONSTERS

139-142

Man-eating sharks - awesome 'devilfish' - gaint squid - 'killer bees' - vampire bats - monster lizards - overcoming phobias



NEW TECHNOLOGY

MEDICINE NOW

233-236

New equipment and techniques - the electron-beam microscope - seeing inside the body - monitoring healing bandages made from seaweed

GHOSTBUSTING

237-238

Paranormal activity - psychokinetic 'energy' - the minilab - unexplained levitation - poltergeists - the laryngograph - telepathy - ghosts

SPACE FRONTIERS



SPACE ODYSSEY

35-38

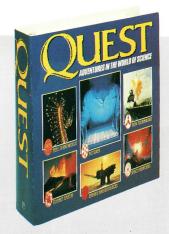
Voyager 2's journey to Neptune - ice volcanoes - pools of liquid hydrogen -Jupiter's dangerous magnetic field - lethal radiation - Saturn's rings - mapping Venus

LOOKING FOR LIFE

39-42

Interstellar messages - powerful radio telescopes - the beginnings of life - our vital Sun - searching for other galaxies

Pack cover: an artist's impression of Voyager 2's journey to Neptune; researching into DNA. Fact file cover: the 76-metre diameter dish of Mark 1A – a radio telescope near Manchester, UK; diagram of a laryngograph.



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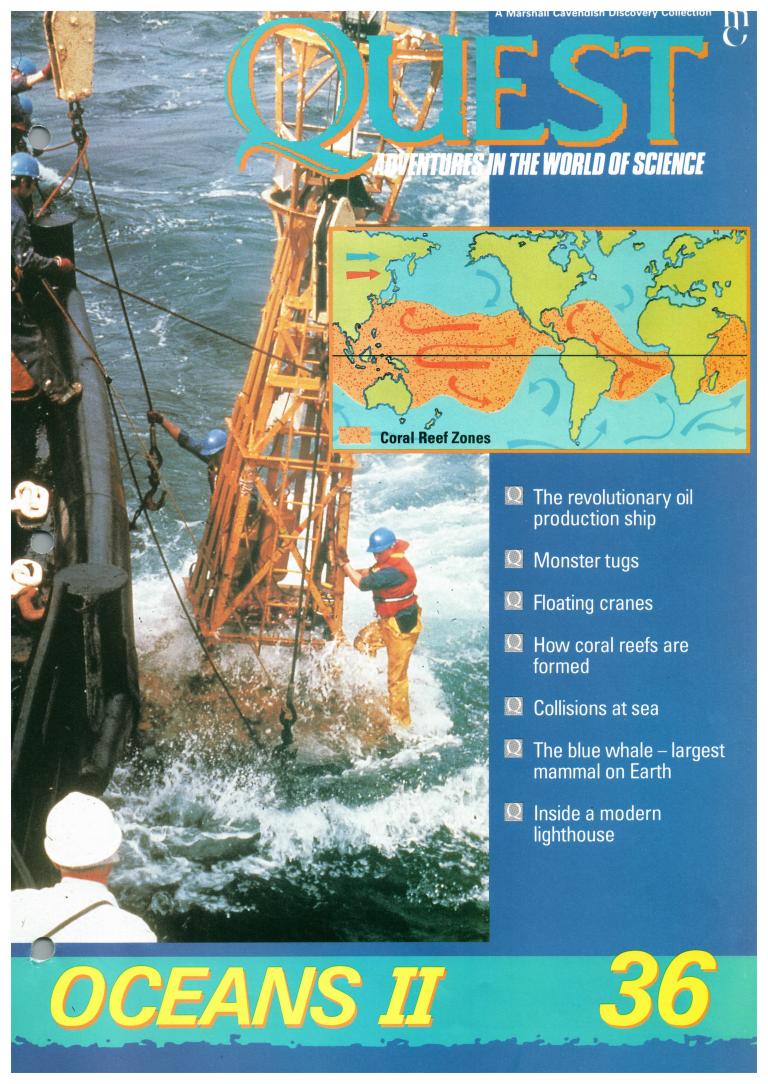
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PLANET EARTH

CORAL REEFS

141-144

Structures made from limestone skeletons - life cycle of a coral polyp - types of reef - plant and fish life

THE LIVING WORLD

OCEAN GIANTS

143-146

Toothed and baleen whales - filtering food - blow-holes - using sonar - whale songs - commercial whaling techniques





NEW TECHNOLOGY

NAVIGATION

239-242

Autopilot – avoiding collisions – satellite navigation systems – accurate position fixes – distress signals – video maps of harbours – separation zones

OIL SHIPS

243-246

Supertankers – oil spills – pollution – loading and unloading at sea – floating hoses – computerized controls

OPERATION SALVAGE

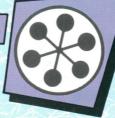
247-250

Refloating stricken vessels - trawling for aircraft pieces - marine archaeology locating sunken wrecks - sidescan sonar salvage submarines

FUTURES

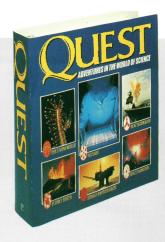
THE RISING SEAS

101-102



The Greenhouse Effect - rising sea levels - global warming - melting glaciers - erosion of beaches and river deltas - vulnerable islands

Pack cover: an oil tanker (top); a marine archaeologist recovering a pottery bowl (inset). Fact file cover: maintenance work on a buoy; diagram of coral reef areas of the world.



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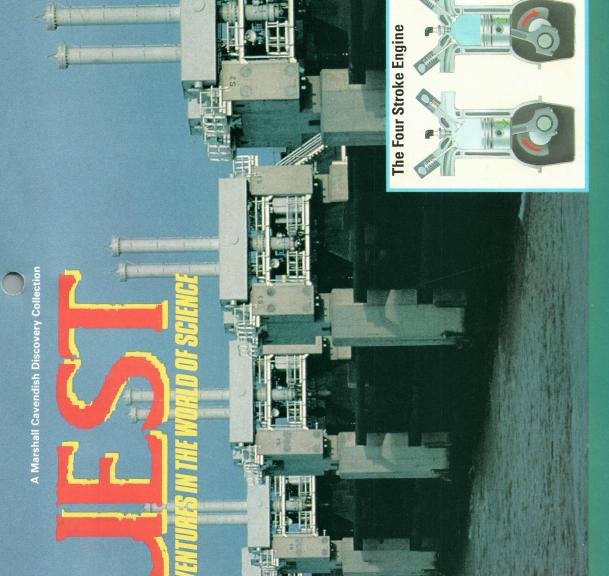
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GROWING STRUCTURES

147-148

Chlorophyll - trapping the Sun's energy photosynthesis - root systems - aerial roots reproduction - pollination

DAM-BUILDING

251-254

Reservoirs - irrigation - hydroelectric power stations - diverting a river - tidal barriers - sea dams - dam disasters



CAR CONSTRUCTION

255-258

Better road holding - 'lean-burn' engines catalytic converters - turbocharging supercharging - rear-wheel steering

ARMY ENGINEERS

259-260

Assembling portable bridge sections - building temporary roads and helipads - filling ditches



FACTORIES IN SPACE

43-44

Advantages of microgravity - growing perfect crystals - researching proteins perfectly curved shapes

MICROENGINEERING

the smallest greetings card

Nanotechnology - machines made of

atoms - scanning-probe microscopes -

103-104





RECLAIMING THE LAND

107-110

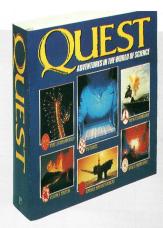
Land below sea-level - draining marshlands - building dykes - the longest sea dam new engineering techniques

SOFTWARE DESIGN

111-112

Software engineers - different programs - special languages - fail-safe devices - icons and 'earcons'

Pack cover: London's Docklands development, UK; Peugeot's Proxima high-performance car (inset). Fact file cover: Eastern Scheldt barrier, Netherlands; diagram of a standard engine.



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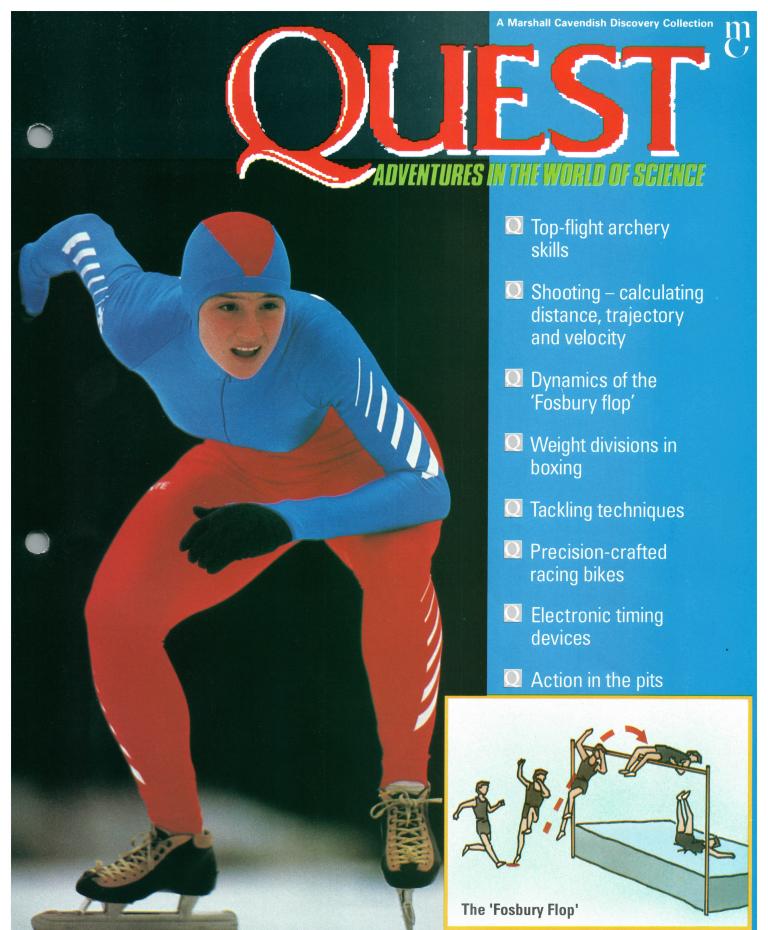
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SCIENCE OF SPORT II 38

CONTENTS 38



SPEED ON SNOW

145-148

Competitive skiing - tight turns - fast runs - electronic timing - reducing drag - speed trials - steering a bobsleigh

THE HUNT

149-150

Training and breeding foxhounds flushing out the fox - hare coursing - anatomy of a shotgun - bullfighting



POWER IN MOTION

Dynamics of jumping events - take-off and trajectory - main forces in throwing competitions - importance of build



PITSTOP

261-264

Specialized racing tyres - anti-skid tread pneumatic spanners - emergency repairs - suspension adjustment

GY AND RESO

ROUGH STUFF

113-116

Contact sports - speed and stamina timing and tactics - offensive and defensive players - protective gear

SUPER CYCLING

117-118

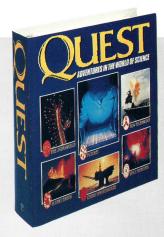
Precision-crafted machines - flexible frames - metal fatigue - lightweight accessories - track bikes - sprints

ON TARGET

119-120

Principles of good marksmanship equipment guidelines - bows and arrows - Olympic shooting events

Pack front cover: a downhill racer (main picture); computer screen in a Formula One racing car. Fact file cover: speed skating; diagram of the 'Fosbury flop'



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- What makes plastic unique?
- The structure of skin

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Basic Elements of Matter

- The science of ceramics
- Mean the second How acid rain affects the world's forests
- Tracer materials in medicine, industry and scientific research
- The timber trade
- Alloys metals made to measure

MATERIALS





PLANET EARTH

TIMBER

149-152

Wood formation - water-conduction cells - softwoods and hardwoods - the sawmill - different grains - veneers

THE LIVING WORLD



COVER-UP

155-158

Structure and functions of skin insulating materials - sweat glands natural 'body armour' - tanning hides



NEW TECHNOLOGY

SEMICONDUCTORS

265-266

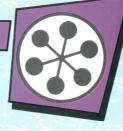
Silicon chips - transistors - increasing conductivity - resistivity to electrical current - superconductors

FANTASTIC PLASTIC

267-270

Efforts of heat - different shaping processes - fibres and foams - common composites - biodegradable plastic

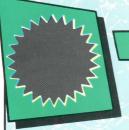
FUTURES



SUPER CERAMICS

105-106

Heat-resistant materials – uses in industry and engines – new, stronger clays – ceramic-metal mixtures



ENERGY AND RESOURCES

METALS

121-122

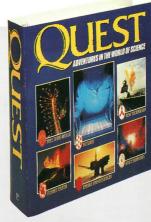
Special properties - malleability conductivity - extraction processes smelting - electrolyzation - alloys

MATERIAL MATTERS

123-126

Matter - atomic particles - natural and synthetic elements - radioisotopes tracer materials - asbestos

Pack front cover: thick fur protects the polar bear from the Arctic cold; shaping hot plastic (main image), natural and synthetic diamonds (inset right). Fact file cover:



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